

INTERACTIVE COMMAND-REPEATER TOY SYSTEM
SPECIFICATION

Field of the Invention

[0001] This invention relates generally to interactive toy systems and particularly to systems employing a plurality of interactive devices responsive to a common command source.

Background of the Invention

[0002] With the rapid and almost astonishing development of low-cost compact digital electronic systems and devices, the level and complexity of toys have dramatically increased. Complete digital systems which include a microprocessor, associated memory, display devices and motor controls have become compact and practical and mass-produced relatively low-cost toys. As a result, toys have been provided which are often extremely life-like and exhibit a surprising number of movements and activities. Such movements and activities readily include the creation of complex sound effects, various light interactive patterns and movement of the toy. The complex responses and behavior patterns created by such toys enables manufacturers to provide a great variety of toys in a mass-produced environment.

[0003] In a parallel and related art, the systems utilized in digital electronic communication have enjoyed a corresponding development rate. Practitioners have provided digital communication systems which are extremely compact and relatively low-cost. Perhaps more importantly such systems have been provided with the capability to operate at extremely low

power levels effectively. The latter is particularly important in the implementation of such systems in the battery powered toy environment.

[0004] With the development of such compact low-cost and effective digital communication systems, communication between toys utilizing radio frequency signals, infrared energy, sound energy, ultrasonic energy and magnetic energy have become state-of-the-art and in most instances common place within toy devices. Such systems facilitate the communication of digitally encoded commands and data to a toy throughout a room environment.

[0005] In a more recent development trend within the toy arts, practitioners have in essence combined the advances in complex microprocessor systems and digital communication systems to produce a category of toys often referred to as “interactive” toys. Such toys are referred to as interactive due to their ability to respond to commands and data digitally communicated between toys or among toys. With proper programming, such responses often create the perception of interaction between the toys. Still other devices are truly interactive in that the systems are sufficiently complex to actually respond to a digital communication with a unique and appropriate response. Thus, toy figures and dolls as well as other devices such as toy vehicles and games and the like have been provided which are either truly interactive or provide an appearance of interactive behavior.

[0006] As interactive toys proved to be extremely popular with consumers, practitioners in the art responded with the rapid development of a virtually endless variety of interactive games and toys. For example, US Patent 6,238,262 issued to Pracas sets forth an ELECTRONIC INTERACTIVE PUPPET having a puppet like body resembling a human figure. Within the electronic system of the puppet, a source of video information is utilized in communicating with

the puppet. The communication is carried forward by utilizing the vertical synchronization signal of the video system. Detection of the vertical synchronization system within the puppet triggers a cassette player within the toy. The result is the appearance of interaction rather than actual interaction.

[0007] US Patent 4,840,602 issued to Rose sets forth a TALKING DOLL RESPONSIVE TO EXTERNAL SIGNAL in which a doll cooperates with a remote signal source which provides a narration with which the doll interacts. The doll has a stored vocabulary within memory which is accessed to cause speech production within the doll to simulate a speech response. The doll has a radio frequency receiver which receives encoded data from a remote signal source. Data may be embedded within a video source such as a television or VCR for communication of information to the doll.

[0008] US Patent 5,191,619 issued to Aldava et al sets forth an INTERRELATIONAL AUDIO KINETIC ENTERTAINMENT SYSTEM in which moveable and audible toys and other animated devices spaced apart from a television screen are provided with program synchronized audio and controlled data to interact with the program.

[0009] US Patent 4,807,031 issued to Broughton et al sets forth an INTERACTIVE VIDEO METHOD AND APPARATUS in which a toy such as a toy vehicle receives commands from a base unit operatively coupled to the video output of a television receiver. Command data is embedded within the television display video. The base unit is housed in a box secured near the television receiver which detects modulated video fields by illumination detection and broadcasts commands to the toy vehicle. As a result, the toy vehicle can be made to appear to interact with the video display information on the television receiver.

[0010] US Patent 4,846,693 issued to Bear sets forth a VIDEO BASED INSTRUCTIONAL AND ENTERTAINMENT SYSTEM USING ANIMATED FIGURE includes a figure resembling a teddy bear which is coupled to a control unit by a tether. A second tether is coupled to a user input unit allowing the player to input various commands. A source of video information such as a VCR is connected to a conventional television receiver. Data is embedded within the video information of the television signal while audio is extracted from the audio track of the program material.

[0011] US Patent 6,415,439 issued to Randell et al sets forth a PROTOCOL FOR A WIRELESS CONTROL SYSTEM which enables unidirectional communication in a simplex environment or bi-directional communication in a duplex environment between a controller or one or more controlled devices. The controller transmits data and control data which may include voice synthesis information and motor movement for use by the controlled devices.

[0012] US Patent 5,213,337 issued to Sherman sets forth a SYSTEM FOR COMMUNICATION USING A BROADCAST AUDIO SIGNAL in which data is embedded within the audio communication path of a television program or the like. A game box receives the embedded audio data and produces a corresponding set of controllable signals for operative game devices.

[0013] US Patent 5,655,945 issued to Jani sets forth a VIDEO AND RADIO CONTROLLED MOVING AND TALKING DEVICE which includes at least one moving and talking remote device together with a source of video information such as a video cassette recorder. Data is embedded within unused portions of the program information typically referred to as vertical interval space. The encoded signal is displayed when the VCR tape is played and

detected by a control box coupled between the VCR and a conventional television. The control box in turn generates a radio frequency signal within which data and commands are encoded. A toy such as a toy bear includes circuitry responsive to the transmitted commands and data.

[0014] US Patent 6,317,714 issued to Del Castillo et al sets forth a CONTROLLER AND ASSOCIATED MECHANICAL CHARACTERS OPERABLE FOR CONTINUOUSLY PERFORMING RECEIVED CONTROLLED DATA WHILE ENGAGING IN BI-DIRECTIONAL COMMUNICATION OVER A SINGLE COMMUNICATIONS CHANNEL which provide efficient bi-directional communication despite substantial bandwidth limitations. A radio frequency unit is connected to a personal computer. The personal computer controls direction and activity of a responsive toy such as a toy figure or doll via the radio frequency link.

[0015] US Patent 6,319,010 issued to Kikinis sets forth a PC PERIPHERAL INTERACTIVE DOLL utilized in teaching, entertaining and habituating a child. The system utilizes an interactive entity such as doll having input and output elements and control circuitry for responding to data and commands received by a link to a personal computer.

[0016] US Patent 3,493,674 issued to Houghton sets forth a TELEVISION MESSAGE SYSTEM FOR TRANSMITTING AUXILIARY INFORMATION DURING THE VERTICAL BLANKING INTERVAL OF EACH TELEVISION FIELD in which data is embedded within television broadcast information by utilizing the unused time interval corresponding to the vertical blanking period.

[0017] US Patent 6,022,273 issued to Gabai et al sets forth an INTERACTIVE DOLL in which a computer system is operative to transmit a first transmission via a first wireless

transmitter and at least one toy including a first wireless receiver receives the transmitted signal and is operative to carry out action based responses. Direct commands from the computer are transmitted via this transmission system to the responsive toy figure or figures.

[0018] US Patent 6,064,854 issued to Peters et al sets forth a COMPUTER ASSISTED INTERACTIVE ENTERTAINMENT/EDUCATION CHARACTER GOODS in which a computer is linked to a toy via cable or wireless communication. The toy responds to the transmitted communications in a predetermined manner.

[0019] US Patent 5,733,131 issued to Park sets forth an EDUCATION AND ENTERTAINMENT DEVICE WITH DYNAMIC CONFIGURATION AND OPERATION in which a toy receives data directly from the high power broadcast transmitters in a television broadcast environment.

[0020] While the above-described prior art devices have to some extent improved the art and in some instances enjoyed commercial success and usage, there remains nonetheless a continuing need for ever more improved and amusing and entertaining interactive toy systems.

Summary of the Invention

[0021] Accordingly, it is a general object of the present invention to provide an interactive toy system. It is a more particular object of the present invention to provide an improved interactive toy system which facilitates the use of multiple responsive toy responses in combination with one or more command units. It is a still more particular object of the present invention to provide an improved interactive toy system in which the command integrity

operative between the toys and the source of commands is maintained in an improved range of locals within a given environment.

[0022] In accordance with the present invention, there is provided a source of communicated data providing data in a first communication link; a plurality of toys each having means for receiving and recovering data via a second communication link; action means within each of the toys responsive to recovered data to create toy activity such as sound, movement or light; and a repeater having means for communicating with the source via the first communication link, means for recovering data, means for applying the data to the second communication link and means for transmitting the data to the toys via the second communication link.

Brief Description of the Drawings

[0023] The features of the present invention, which are believed to be novel, are set forth with particularity in the appended claims. The invention, together with further objects and advantages thereof, may best be understood by reference to the following description taken in conjunction with the accompanying drawings, in the several figures of which like reference numerals identify like elements and in which:

[0024] Figure 1 sets forth a generalized block diagram of the present invention interactive command repeater toy system;

[0025] Figure 2 sets forth a block diagram of a preferred embodiment of the present invention interactive command repeater toy system;

Description of the Preferred Embodiments of the Invention

[0026] Figure 1 sets forth a block diagram of a generalized version of the present invention interactive command repeater toy system generally referenced by numeral 10. System 10 includes a data source 11 having a data input 12 coupled thereto. Source 11 is fabricated to provide a communication link to a repeater 13. A plurality of responsive toys 14, 15, 16 and 17 are positioned in the general environment of repeater 13 and are responsive to communications from repeater 13.

[0027] In operation, source 11 may be any one of a variety of communication devices including a television receiver, a computer, an audio system such as radio, or the like. Data input 12 comprises apparatus for applying data to source 11 which is communicated by source 11 to repeater 13. Thus, data 12 may comprise apparatus for user input of various commands intended to eventually be communicated to one or more of toys 14 through 17.

[0028] Repeater 13 includes apparatus for receiving communication from source 11 together with apparatus for communicating directly with toys 14 through 17. In the preferred fabrication of the present invention, repeater 13 is positioned proximate source 11 while toys 14 through 17 may be substantially displaced from source 11 receiving their command information from repeater 13 rather directly from source 11. In the preferred fabrication of the present invention, the communication link between source 11 and repeater 13 may utilize one communication mechanism while the communication link between repeater 13 and toys 14 through 17 may utilize a different mechanism. In addition, the modulation method or data encoding of information between source 11 and repeater 13 may utilize an entirely different

protocol or system than the data communication method used between repeater 13 and toys 14 through 17.

[0029] By way of example, source 11 may comprise a conventional television receiver having capability for providing video display and audio output. Correspondingly, data input 12 may comprise a video or audio watermarking system which in accordance with conventional fabrication techniques utilizes portions of the displayed video information or portions of the audio information displayed or outputted by source 11. Correspondingly, repeater 13 is configured to receive the data encoded video or audio information and remove or decode the information therefrom. The decoded information is then communicated by repeater 13 using a selected medium and protocol to toys 14 through 17.

[0030] Thus, in the above-described example in which source 11 comprises a conventional television receiver, data input 12 may comprise a source of program material such as a video disk or video tape upon which a digitally encoded water mark signal has been placed. The response of source 11 to the input information is carried forward such that water marked video or audio is produced by the television receiver.

[0031] Within repeater 13 a video detector responsive to water marked data in the event a video water marked communication system is used, receives the water marked video information and decodes the data therefrom. In the event an audio watermarking system is utilized by source 11, then repeater 13 is suitably configured to receive and decode the audio information and thereafter remove and recover the encoded data from the audio information. In either case, repeater 13 encodes the recovered data on the appropriate communication link utilized between repeater 13 and toys 14 through 17. By way of example, repeater 13 may utilize a radio

frequency communication with toys 14 through 17. In this case, repeater 13 includes a conventional RF transmitting unit as well as appropriate modulating apparatus for modulating the radio frequency carrier utilized by repeater 13 with the desired encoded data. Conversely, toys 14 through 17 utilize conventional radio frequency receiving and decoding apparatus for receiving the radio frequency communication from repeater 13 and decoding or demodulating the information therefrom. Thereafter, toys 14 through 17 respond in accordance with the command data and perform their various operations or activities.

[0032] By way of additional example, repeater 13 may communicate with toys 14 through 17 using an ultrasound link in which ultrasound encoded information is transmitted by repeater 13 to toys 14 through 17. In this case, toys 14 through 17 employ conventional ultrasound receiving and decoding apparatus to again recover the encoded command data and respond accordingly.

[0033] It will be apparent to those skilled in the art that considerable latitude exists in selecting the type of source 11 utilized in the present invention system. Further, it will be apparent that considerable latitude exists in selecting the communication link to be utilized between source 11 and repeater 13 as well as the link between repeater 13 and toys 14 through 17.

[0034] In accordance with an important aspect of the present invention, and as is illustrated below in Figure 2, the communication mechanism used between source 11 and repeater 13 may be selected with the intent of employing a short range communication in which the position of repeater 13 with respect to source 11 may be selected to optimize the communication capability therebetween. Conversely, and in further accordance with the present invention, the

communication mechanism selected for use between repeater 13 and toys 14 through 17 may result from considerations of play value and activity. For example, in the anticipated use of the present invention system, the range of locations within which repeater 13 is able to communicate with toys 14 through 17 may be selected to optimize the ability of 14 through 17 to remain in communication with repeater 13 throughout extended areas of the play environment without the need to maintain line of sight communication with repeater 13. Accordingly, in this circumstance and as is illustrated in the preferred embodiment set forth below in Figure 2, repeater 13 and toys 14 through 17 communicate via a radio frequency communication link. This provides substantial range of communication as well as the ability of communication without extensive concern for intervening objects such as furniture or walls or the like.

[0035] Figure 2 sets forth a block diagram of a preferred embodiment of the present invention interactive command repeater toy system generally referenced by numeral 20. By way of overview, system 20 is selected primarily to optimize the utilization of the present invention system in the operation of a plurality of toys within an extended play environment such as a home or the like. In addition, the systems set forth in Figure 20 are also selected to utilize a substantially close relationship between repeater 30 and program source 21. Thus, in the example shown, communication between the program source and the repeater utilizes a water marked audio communication while the communication link between repeater 30 and toys 43 through 49 employs a modulated radio frequency signal allowing substantial movement of toys 43 through 49.

[0036] More specifically, system 20 includes a program source 21 which comprises a conventional television receiver. Television receiver 21 includes a video display 22 and an audio

output 23 which may for example comprise a conventional speaker. System 20 further includes a data source 24 which provides the command data intended to be communicated to the plurality of toys within system 20. Data source 24 is coupled to a watermarking system 25.

Watermarking system 25 utilizes a selected one of well known watermarking methods to embed the provided by data source 24 into the audio information channel of television 21. The watermarked audio and embedded data then forms the audio information output for audio system 23 of program source 21. In the preferred fabrication of the present invention, watermark system 25 is selected to maintain useful audio communication for television receiver 21 and in the best of circumstances the embedded data within the audio output of television 21 is not heard by the user.

[0037] System 20 further includes a repeater 30 having an input sensor 31, a processor 32 and a transmitter 33. Transmitter 33 is coupled to an antenna 34. Repeater 30 utilizes the watermarked audio information sensed by sensor 31 and in accordance with the operation of processor 30 decodes the embedded data therein. The embedded data once recovered is applied to transmitter 33 within which a conventional modulation or encoding of the data takes place. The resulting information bearing radio frequency signal is applied to antenna 34 and is broadcast throughout the environment of room 40. It will be noted that room 40 is typical of room environments of most dwellings in that obstacles such as walls 41 and 42 within the room.

[0038] In further accordance with the present invention, a plurality of responsive toys 43 through 49 are variously positioned within room 40. It will be noted that toys 43, 44 and 45 may arguably be within the line of sight of television 21 and repeater 30. However, it will also be noted that toys 46, 47, 48 and 49 are not in a line of sight relationship with either repeater 30 or

television receiver 21. This allows the illustration of an important aspect of the present invention. The use of a radio frequency communication link between repeater 30 and toys 43 through 49 removes the need for line of sight positioning of the toys. Despite the intrusion of walls 41 and 42 into the communication path, the well-known radio frequency wave penetration of such obstacles allows the communication with toys 46 through 49 to be maintained.

[0039] Toys 43 through 49 are illustrative of a variety of toys which include conventional radio frequency signal receiving apparatus together with decoding apparatus for recovering the command information therefrom. In addition, toys 43 through 49 will be understood to include conventional activity means responsive to such commands. Such response means may include various audio, visual movement responses within toys 43 through 49.

[0040] By way of example, toy 45 is shown in block diagram representation and includes a radio frequency receiver 50 together with a decoder 51 and an action system 52. Receiver 50 is coupled to a receiving antenna 53. Accordingly, the information bearing radio frequency signal transmitted by repeater 30 is received at antenna 53 providing an input radio frequency signal to receiver 50. Receiver 50 includes conventional apparatus for selecting the desire radio frequency signal and communicating it to decoder 51. Decoder 51 includes conventional apparatus for demodulating or decoding the information bearing received radio frequency signal. Thereafter, the recovered data at decoder 51 is applied to action system 52. Action system 52 is illustrative of a virtually endless variety of well known toy apparatus which provides some type of movement, sound or light output to produce the desired play effect.

[0041] Thus, it will be apparent to those skilled in the art that the present invention system illustrated in Figure 2 provides substantial advantages for interactive toy play. An important

advantage is found in the use of a relatively low-cost convenient communication mechanism between television 21 and repeater 30. In addition, the system shown in Figure 2 provides substantial advantage in that the use of a radio frequency communication link between repeater 30 and toys 43 through 49 facilitates the continued communication and operation of the toys despite movement to positions behind walls, furniture, doors and the like within the play environment.

[0042] While particular embodiments of the invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from the invention in its broader aspects. Therefore, the aim in the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of the invention.